

Cable Median Barrier

Reassessment and Recommendations Update

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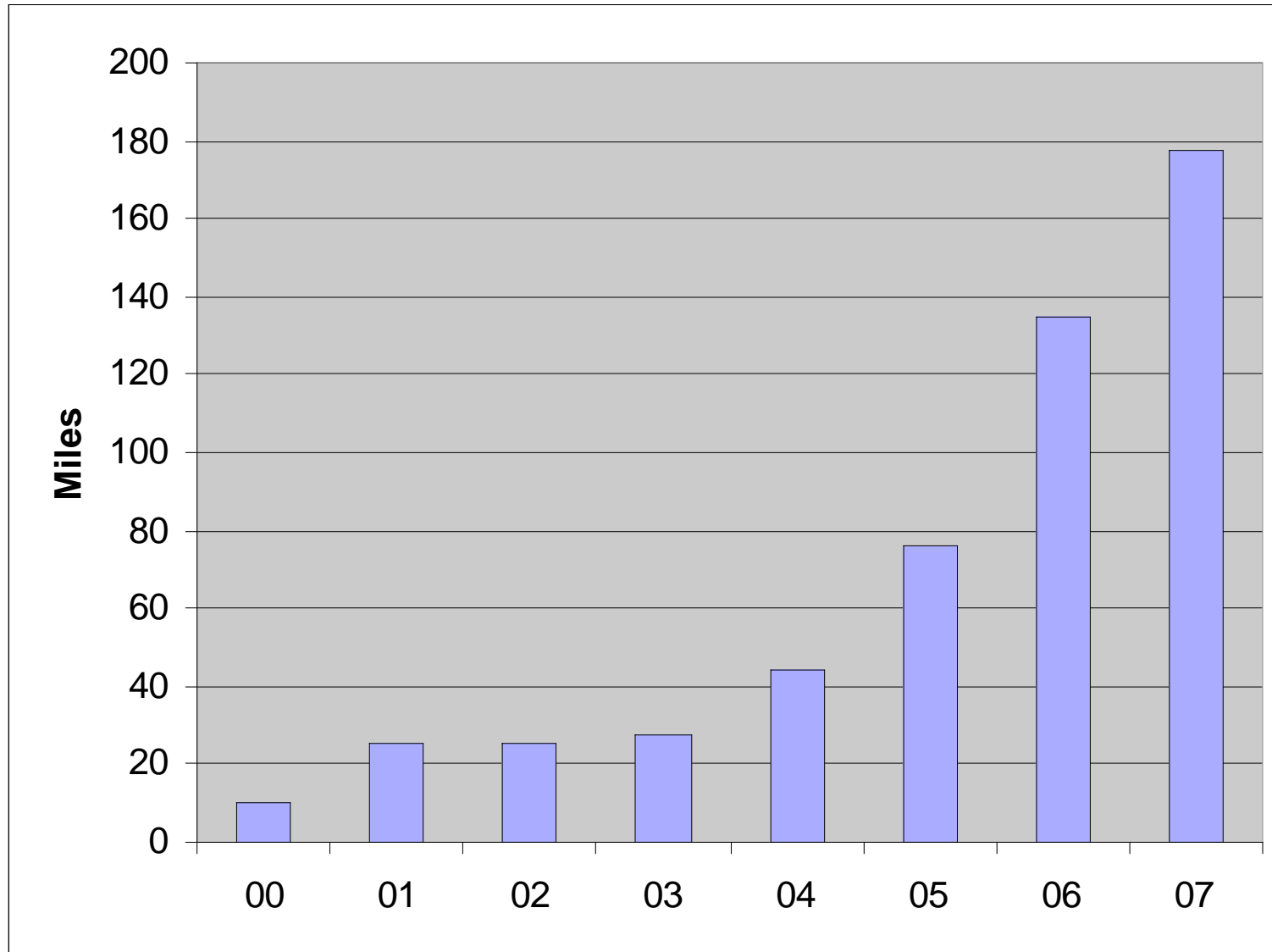
What is this Report?

- Update to the 2007 study prepared at Governor Gregoire's request.

What's New?

- 43 miles of installation completed in 2007
 - 177 total miles in place by the end of 2007.
 - Nearing completion of the Transportation Partnership Account and Nickel program commitments for median barrier protection.

Miles By Year of Installation



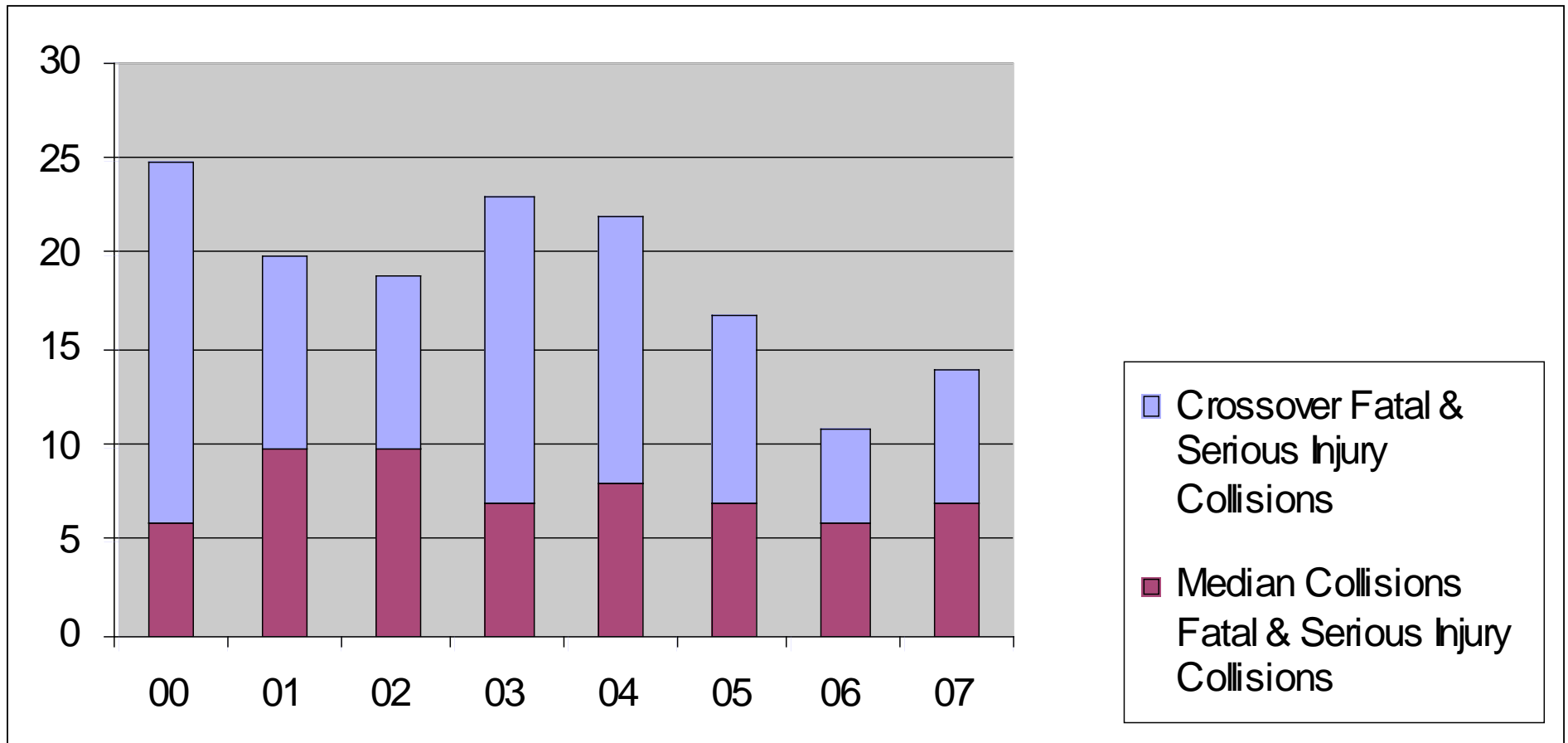
Cable Barrier in the News



Very Limited Press Coverage



Number of Serious Injury & Fatal Collisions By Year



Collision Rates Before & After Cable Barrier Was Installed

CROSS MEDIAN COLLISIONS	Before	After	Percent Change
Annual cross-median incidents	54.4	14.9	-73%
Cross-median collision rate (per 100 million vehicle miles)	1.85	0.58	-69%
Annual serious injury cross-median collisions	8.6	1.5	-83%
Annual fatal cross-median collisions	5.0	2.2	-57%

Collision Rates Before & After Cable Barrier Was Installed

ALL MEDIAN COLLISIONS	Before	After	Percent Change
Annual Median Collisions	223	561	152%
Median collision rate (per 100 million vehicle miles)	7.64	14.66	92%
Annual serious injury median collisions	16.6	5.2	-69%
Annual fatal median collisions	8.2	4.4	-47%

Performance Comparison

Barrier Performance	Cable Barrier	Concrete Barrier
Contained in median	956 (82.6%)	355 (38.0%)
Redirected	145 (12.5%)	556 (59.6%)
Cross-median	57 (4.9%)	22 (2.4%)
Total	1158	933







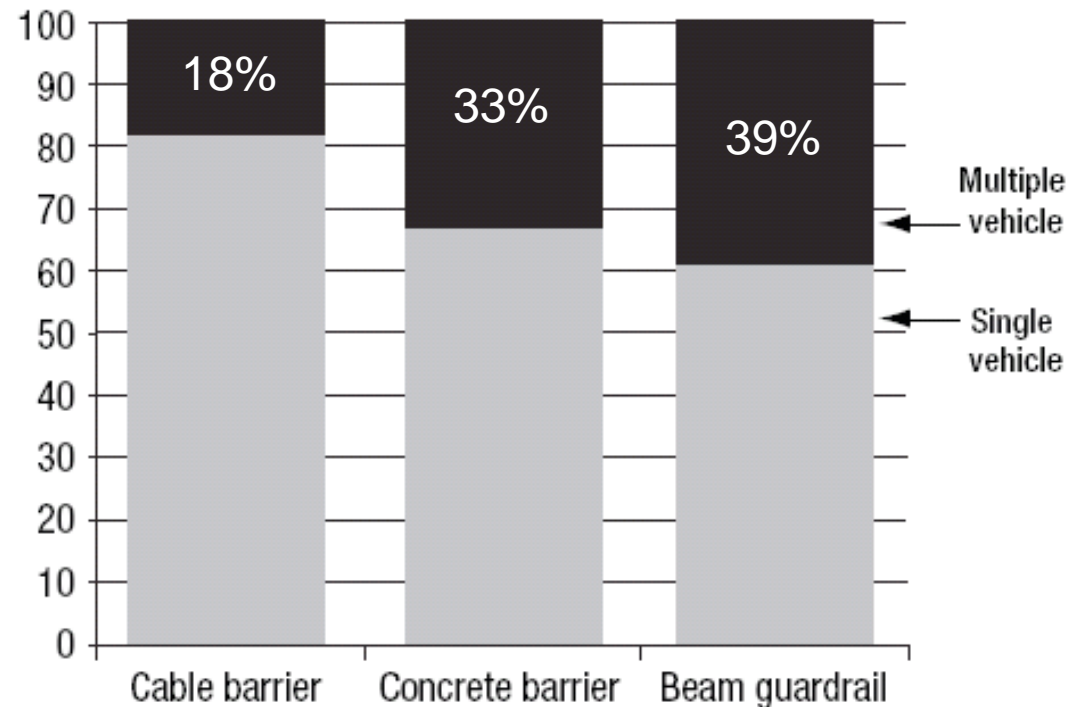
Injury Comparison by Barrier Type

Barrier Type	Reported Collisions	Not Stated	No Injury	Possible Injury	Evident Injury	Serious Injury	Fatal
Cable Barrier	1,158	25 (2.2%)	890 (76.9%)	122 (10.5%)	94 (8.1%)	17 (1.5%)	10 (0.9%)
Cable Barrier (without Marysville)	865	21 (2.4%)	672 (77.7%)	87 (10.1%)	69 (8.0%)	13 (1.5%)	3 (0.3%)
Beam Guardrail	2,204	55 (2.5%)	1,317 (59.8%)	493 (22.4%)	284 (12.9%)	40 (1.8%)	15 (0.7%)
Concrete Barrier	7,004	156 (2.2%)	4,106 (58.6%)	1,772 (25.3%)	837 (12.0%)	96 (1.4%)	37 (0.5%)
Total	10,366	236 (2.3%)	6,311 (60.9%)	2,387 (23.0%)	1,215 (11.7%)	153 (1.5%)	62 (0.6%)

Percentage of Multi-vehicle Collisions

2002-2006*

Percent



*Time period analyzed for concrete barrier and beam guardrail collisions.

Number of Injuries Per Event

	Cable Barrier	Concrete Barrier	Beam Guardrail
Single Vehicle Collisions	0.19	0.45	0.46
Multiple Vehicle Collisions	1.00	0.69	0.70
All Collisions	0.33	0.53	0.55

Low Tension vs. High Tension

	Low-tension Cable Barrier (43 miles) 1995-2007	High-tension Cable Barrier (134 miles) 2004-2007	Concrete Barrier (58 miles) 2002-2006
Cross-median incidents	43 (5.8%)	14 (3.3%)	22 (2.4%)
Cross-median rate (per 100 million VMT)	0.62	0.50	0.28
Fatal crashes involving barrier	7 (0.9%)	3 (0.7%)	7 (0.8%)
Fatal crash rate (per 100 million VMT)	0.10	0.14	0.13



Rollover Collisions

	Before	After	Percent change
Annual median rollover collisions	83.4	52.1	-37%
Annual fatal median rollover collisions	2.8	0.7	-74%

Motorcycle Crashes

- WSDOT has carefully reviewed each collision.
- Reviewed national studies.
- No link between cable barriers and more severe injuries for motorcyclists.
- New (national) study getting started.

Progress for Marysville

- Widen NB shoulder to 10', install concrete barrier next to widened shoulder, leave cable barrier adjacent to SB lanes.
- Cost estimated at \$27 Million for 10 miles.
- Project will be advertised in Spring 2009.

Next Steps

- Looking at other locations – part of next report
 - Including partial access controlled facilities isolated locations such as Hwy 8.
- Implementing changes in WSDOT policy.
- Research efforts to improve cable barrier systems well underway.
- Evaluating retrofit of existing systems based on new research.

WSDOT Policy Changes

- Placement on slopes – proximity to breakpoint.
- New methods for securing cable to hardware.
- Review of crash history in barrier selection.
- New installations on slopes – move to higher systems until research is completed.

Research Efforts

- Placement within the median.
- Higher bumper heights of pickups & SUVs.
- Traffic conditions that promote cross median collisions.
- Hardware connection.
- Retrofit of low tension to high tension.

Crash Test Criteria Changes Larger Vehicles



Old Test Vehicle

Proposed Test Vehicle

Dr. Ray's Conclusions

- Sites with highest frequency cross median collisions have been identified.
- Majority of sites appear to be performing well.
- WSDOT has made excellent progress in implementing recommendations.
- Screening process suggested in 2007 will be useful.

Design Evolutions

- Industry has done some analysis of vehicle trajectories
 - Trying to determine critical cable heights.
- Designs are being developed for use on steeper slopes.
- Installations with reduced deflection installed as “test sections” in narrower medians.
- Retrofits for existing installations.

Questions?

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